

WHAT IS CLAIMED IS:

1 1. A body fluid sampling system comprising:
2 a penetrating member driver;
3 a plurality of penetrating members sufficient for penetrating tissue;
4 a tape coupling together at least two of said penetrating members;
5 a penetrating member release device removing the penetrating member
6 from a sterile environment prior to use and moving said penetrating member into position
7 to be operatively coupled to said penetrating member driver.

1 2. The system of claim 1 wherein said release device comprises a
2 rotating member having a portion of sufficient sharpness to at least partially penetrate
3 said tape and a portion shaped to engage said penetrating member, said rotating member
4 movable to urge said penetrating member to engage a coupler on the penetrating member
5 driver.

1 3. The system of claim 1 wherein said release device comprises a
2 rotating member having a portion of sufficient sharpness to penetrate a penetrating
3 member enclosure.

1 4. The system of claim 1 wherein said release device comprises a
2 movable member sufficient to pierce a penetrating member enclosure, engage the
3 penetrating member, and moving said penetrating member to engage a coupler on the
4 penetrating member driver.

1 5. The system of claim 1 further comprising a penetrating member
2 unloading device to remove said penetrating member from the penetrating member driver.

1 6. The system of claim 1 wherein said penetrating members comprise
2 a unitary body.

1 7. The system of claim 1 wherein said penetrating members are
2 without molded attachments.

1 8. A tissue penetrating system for use with at least one penetrating
2 member, the tissue penetrating system comprising:

3 a penetrating member driver;
4 a penetrating member release assembly removing the penetrating member
5 from a sterile environment prior to use, wherein a sharpened tip of said penetrating
6 member is fully enclosed in said sterile environment prior to use, and
7 a rotatable device is configured to move said penetrating member into
8 position to be operatively coupled to said penetrating member driver.

1 9. A tissue penetrating system for use with a plurality of penetrating
2 members, the tissue penetrating system comprising:

3 a penetrating member driver;
4 a penetrating member release device removing one of the penetrating
5 members from a sterile environment prior to use;
6 a penetrating member loading device receiving penetrating members from
7 the release device, said loading device moving said penetrating member to be operatively
8 coupled to said penetrating member driver.

1 10. The system of claim 9 wherein said loading device comprises a
2 transfer drum having an area shaped to receive one of said penetrating members.

1 11. The system of claim 9 wherein said loading device comprises a
2 transfer drum having an opening for receiving one of said penetrating members.

1 12. The system of claim 9 further comprising penetrating member
2 unloading device for moving said penetrating member from the coupler to a storage
3 canister.

1 13. A tissue penetrating system for use with a plurality of penetrating
2 members, the tissue penetrating system comprising:

3 a penetrating member driver;
4 a penetrating member transport device;
5 a penetrating member loading device receiving penetrating members from
6 the transport device, said loading device moving said penetrating member to be
7 operatively coupled to said penetrating member driver;
8 wherein said penetrating member transport device is configured to receive
9 said penetrating members in a sealed condition and to deliver said penetrating members in
10 an unsealed condition to the penetrating member loading device.

1 14. The system of claim 13 wherein said penetrating member transport
2 device uses a plurality of rollers positioned to advance the penetrating members and to
3 remove each one from a sealed condition prior to reaching the penetrating member
4 loading device..

1 15. The system of claim 13 wherein said penetrating member transport
2 wherein said loading device includes a surface configured for slidably engaging said
3 penetrating member from the transport device.

1 16. The system of claim 13 wherein said penetrating member transport
2 wherein said loading device includes a surface configured for slidably engaging said
3 penetrating member from the transport device, said surface being a hole and an L-shaped
4 penetrating member or a penetrating member with orthogonal orientation.

1 17. A tissue penetrating system for use with a penetrating member
2 driver and a plurality of penetrating members, said system comprising:
3 a tape for holding said penetrating members;
4 a loading device for moving said penetrating member into position to be
5 coupled to the driver;
6 a peel device for removing an active one of said penetrating members from
7 said tape;
8 a tape tension device coupled to the peel device for maintaining said
9 penetrating member and synchronizing said penetrating members with said loading
10 device.

1 18. The system of claim 17 wherein said penetrating members are at a
2 fixed spacing.

1 19. The system of claim 17 wherein said penetrating member transport
2 device uses a plurality of rollers positioned to advance the penetrating members and to
3 remove each one from a sealed condition prior to reaching the penetrating member
4 loading device..

1 20. A tissue penetrating system for use with a penetrating member
2 driver and a plurality of penetrating members, said system comprising:

3 a penetrating member transport device;
4 a penetrating member loading device receiving penetrating members from
5 the transport device, said loading device moving said penetrating member to be
6 operatively coupled to said penetrating member driver;
7 a tape peeling assembly peeling said tape apart into a first portion and a
8 second portion, said first portion peeled apart at a selected peel angle relative to the
9 second portion.

1 21. The system of claim 20 wherein said tape peeling assembly
2 prevents said tape from jamming by maintaining a consistent tension when the tape is
3 being advanced and peeled apart.

1 22. The system of claim 20 wherein said tape peeling assembly
2 provides a sufficient tension when the tape is being advanced so that the peel point does
3 not change in a manner that the penetrating members no longer align with receiving areas
4 on the loading device.

1 23. The system of claim 20 wherein said tape peeling assembly
2 maintains a consistent spacing between penetrating members as the members are coupled
3 to the loading device.

1 24. The system of claim 20 wherein said tape peeling assembly
2 maintains a consistent spacing between a first penetrating member to be removed from
3 the tape and coupled to the loading device, and a second penetrating member to be
4 coupled to the loading device after the first penetrating member is loaded.

1 25. The system of claim 20 wherein said tape peeling assembly
2 includes at least one piercing blade for piercing said tape and engaging a first penetrating
3 member to be coupled to the loading device.

1 26. The system of claim 20 wherein said tape peeling assembly rotates
2 sufficiently to compensate for a slight path difference between the tape and the
3 penetrating member about said loading device, said assembly being tensioned up during
4 advancement of the tape to remove slack in the tape that may alter the peel point.

1 27. The system of claim 20 wherein said tape includes a plurality of
2 tractor holes.

1 28. The system of claim 20 wherein said tape peeling assembly is
2 coupled to a differential that tightens the tension to a predefined level and slips if the user
3 winds the differential to tension beyond the predefined level.

1 29. The system of claim 20 wherein said tape are adhered together in
2 manner such that the tape is peeled apart in a consistent manner.

1 30. The system of claim 20 wherein said blade on the loading device is
2 above the external stroke of the penetrating member, so said penetrating member is kept
3 clean.

1 31. A tissue penetrating system for use with a penetrating member
2 driver and a plurality of penetrating members, said system comprising:

3 a penetrating member transport device;

4 a penetrating member release device for releasing at least one of said
5 penetrating members from a sealed environment;

6 a penetrating member loading device receiving penetrating members from
7 the transport device, said loading device moving said one penetrating member to be
8 operatively coupled to said penetrating member driver;

9 a penetrating member unloading device for removing said one penetrating
10 member from the penetrating member driver.

1 32. A tissue penetrating system for use with a penetrating member
2 driver, said system comprising:

3 means for removing a penetrating member from a sealed enclosure;

4 means for loading said penetrating member from the removing means and
5 transporting said penetrating member to be operatively coupled to said penetrating
6 member driver.

1 33. A method comprising:

2 transporting a plurality of penetrating members each in a sterilized
3 environment towards a penetrating member launch position;

4 releasing said penetrating member from a sterilized environment;
5 loading said penetrating member to be operatively coupled to the
6 penetrating member driver.

1 34. A method comprising:
.2 transporting a plurality of penetrating members each in a sterilized
3 environment towards a penetrating member launch position;
4 releasing said penetrating member from a sterilized environment;
5 loading said penetrating member to be operatively coupled to the
6 penetrating member driver;
7 actuating said penetrating member along a path into a patient wherein the
8 penetrating member tip does not contact external surface as it exits the sterilized
9 environment.

1 35. A method comprising:
2 providing a penetrating member driver;
3 installing a penetrating member release device for removing a plurality of
4 penetrating members from a sterile environment, said penetrating members being
5 transported along a path to being operatively coupled to the penetrating member driver.

1 36. A method comprising:
2 only handling the penetrating member with clean parts from the opening of
3 the pocket to the driver.

1 37. A method comprising:
2 rotate indexing mechanism;
3 move used penetrating member to bin;
4 index tape of unused penetrating members;
5 align penetrating member with bearing blades on loading device;
6 open sterile pocket by piercing said tape; and
7 engage penetrating member with chuck and index to end stop.

1 38. A tissue penetrating system for use with at least one penetrating
2 member, the tissue penetrating system comprising:
3 a penetrating member driver;

4 a penetrating member release device removing the penetrating member
5 from a sterile environment prior to use and moving said penetrating member into position
6 to be operatively coupled to said penetrating member driver.

1 39. The system of claim 38 wherein said penetrating members are bare
2 penetrating members or without attachments.

1 40. The system of claim 38 wherein said release device comprises a
2 rotating member having an outer portion of sufficient sharpness to penetrate penetrating
3 member enclosure and a portion shaped to engage said penetrating member, said rotating
4 member movable to urge said penetrating member to engage a coupler on the penetrating
5 member driver.

1 41. The system of claim 38 wherein said release device comprises a
2 movable member sufficient to pierce a penetrating member enclosure, engage the
3 penetrating member, and moving said penetrating member to engage a coupler on the
4 penetrating member driver.

1 42. The system of claim 38 further comprising a penetrating member
2 unloading device to remove said penetrating member from the penetrating member driver.

1 43. A tissue penetrating system for use with at least one penetrating
2 member, the tissue penetrating system comprising:

3 a penetrating member driver;
4 a penetrating member release device removing the penetrating member
5 from a sterile environment prior to use, wherein said penetrating member prior to use is
6 fully enclosed in said sterile environment, and wherein said release device is configured
7 to move said penetrating member into position to be operatively coupled to said
8 penetrating member driver.

1 44. A tissue penetrating system for use with a plurality of penetrating
2 members, the tissue penetrating system comprising:

3 a penetrating member driver;
4 a penetrating member release device removing one of the penetrating
5 members from a sterile environment prior to use;

6 a penetrating member loading device receiving penetrating members from
7 the release device, said loading device moving said penetrating member to be operatively
8 coupled to said penetrating member driver.

1 45. The system of claim 44 wherein said loading device includes an
2 upper surface and a lower surface to grip one of said penetrating members and transport it
3 to a coupler on the penetrating member driver.

1 46. The system of claim 44 wherein said loading device comprises a
2 transfer drum having an area shaped to receive one of said penetrating members.

1 47. The system of claim 44 wherein said loading device comprises a
2 transfer drum having an opening for receiving one of said penetrating members.

1 48. The system of claim 44 further comprising penetrating member
2 unloading device for moving said penetrating member from the coupler to a storage
3 canister.

1 49. The system of claim 44 further comprising a cam plate coupled to
2 said penetrating member loading device, wherein said single sliding cam plate
3 coordinates loading and unloading of the penetrating member.

1 50. A tissue penetrating system for use with a plurality of penetrating
2 members, the tissue penetrating system comprising:

3 a penetrating member driver;
4 a penetrating member transport device;
5 a penetrating member loading device receiving penetrating members from
6 the transport device, said loading device moving said penetrating member to be
7 operatively coupled to said penetrating member driver;

8 wherein said penetrating member transport device is configured to receive
9 said penetrating members in a sealed condition and to deliver said penetrating members in
10 an unsealed condition to the penetrating member loading device.

1 51. The system of claim 50 wherein said penetrating member transport
2 device uses a plurality of rollers positioned to advance the penetrating members and to

3 remove each one from a sealed condition prior to reaching the penetrating member
4 loading device..

1 52. A tissue penetrating system for use with a penetrating member
2 driver and a plurality of penetrating members, said system comprising:
3 a penetrating member transport device;
4 a penetrating member loading device receiving penetrating members from
5 the transport device, said loading device moving said penetrating member to be
6 operatively coupled to said penetrating member driver;
7 wherein said penetrating member transport device is configured to receive
8 said penetrating members in a sealed condition and to deliver said penetrating members in
9 an unsealed condition to the penetrating member loading device;
10 wherein said loading device includes a surface configured for slidably
11 engaging said penetrating member from the transport device.

1 53. A tissue penetrating system for use with a penetrating member
2 driver and a plurality of penetrating members, said system comprising:
3 a penetrating member transport device;
4 a penetrating member loading device receiving penetrating members from
5 the transport device, said loading device moving said penetrating member to be
6 operatively coupled to said penetrating member driver;
7 wherein said penetrating member transport device is configured to receive
8 said penetrating members in a sealed condition and to deliver said penetrating members in
9 an unsealed condition to the penetrating member loading device;
10 wherein said loading device includes a surface configured for slidably
11 engaging said penetrating member from the transport device, wherein said surface is a
12 hole and an L-shaped penetrating member or penetrating member with orthogonal bend.

1 54. A tissue penetrating system for use with a penetrating member
2 driver and a plurality of penetrating members, said system comprising:
3 a penetrating member transport device;
4 a penetrating member loading device receiving penetrating members from
5 the transport device, said loading device moving said penetrating member to be
6 operatively coupled to said penetrating member driver;

7 wherein said penetrating member transport device is configured to receive
8 said penetrating members in a sealed condition and to deliver said penetrating members in
9 an unsealed condition to the penetrating member loading device;

10 wherein said loading device grips said penetrating member to move it into
11 a launch position.

1 55. A tissue penetrating system for use with a penetrating member
2 driver and a plurality of penetrating members, said system comprising:

3 a penetrating member transport device;

4 a penetrating member release device for releasing at least one of said
5 penetrating members from a sealed environment;

6 a penetrating member loading device receiving penetrating members from
7 the transport device, said loading device moving said one penetrating member to be
8 operatively coupled to said penetrating member driver;

9 a penetrating member unloading device for removing said one penetrating
10 member from the penetrating member driver.

1 56. A tissue penetrating system for use with a penetrating member
2 driver and a plurality of penetrating members, said system comprising:

3 a penetrating member transport device for moving said penetrating
4 members and for releasing at least one of said penetrating members from a sealed
5 environment;

6 a penetrating member loading device receiving penetrating members from
7 the transport device, said loading device moving said one penetrating member to be
8 operatively coupled to said penetrating member driver, and wherein said loading device
9 also removes said one penetrating member from the penetrating member driver.

1 57. A tissue penetrating system for use with a penetrating member
2 driver, said system comprising:

3 means for removing a penetrating member from a sealed enclosure;

4 means for loading said penetrating member from the removing means and
5 transporting said penetrating member to be operatively coupled to said penetrating
6 member driver.

1 58. A method comprising:

2 transporting a plurality of penetrating members each in a sterilized
3 environment towards a penetrating member launch position;
4 releasing said penetrating member from a sterilized environment;
5 loading said penetrating member to be operatively coupled to the
6 penetrating member driver.

1 59. A method comprising:
2 providing a penetrating member driver;
3 installing a penetrating member transport device for moving a plurality of
4 penetrating members to be operatively coupled to the penetrating member driver.

1 60. A method comprising:
2 transporting a plurality of penetrating members each in a sterilized
3 environment towards a penetrating member launch position;
4 releasing said penetrating member from a sterilized environment;
5 loading said penetrating member to be operatively coupled to the
6 penetrating member driver;
7 actuating said penetrating member along a path into a patient wherein the
8 penetrating member tip does not contact external surface as it exits the sterilized
9 environment.

1 61. A method comprising:
2 providing a penetrating member driver;
3 installing a penetrating member release device for removing a plurality of
4 penetrating members from a sterile environment, said penetrating members being
5 transported along a path to being operatively coupled to the penetrating member driver.